

CLAIMS

What is claimed is:

1. An instrument for assaying the concentration of one or more of nitrogen dioxide, nitrogen monoxide and ozone
5 in an air sample, the instrument comprising:
an equilibrium altering means for changing the equilibrium between nitrogen monoxide and nitrogen dioxide in the presence of ozone and oxygen; and
a first gas sensor for quantifying the concentration
10 of a first gas selected from the group consisting of nitrogen dioxide, nitrogen monoxide or ozone;
wherein the instrument is adapted to measure the concentration of the first gas whilst the equilibrium between nitrogen monoxide and nitrogen dioxide in the
15 presence of ozone and oxygen is altered, and to thereby calculate the concentration of at least one of nitrogen dioxide, nitrogen monoxide and ozone in the air sample.
2. The instrument of claim 1, wherein the equilibrium
20 altering means comprises an ultraviolet light source.
3. The instrument of claim 2, wherein the ultraviolet light source is switched on and off periodically.
- 25 4. The instrument of claim 1, wherein the equilibrium altering means comprises a means for adding at least one gas selected from the group consisting of nitrogen monoxide, nitrogen dioxide or ozone.
- 30 5. The instrument of claim 1, wherein the equilibrium altering means comprises a means for removing one or more of nitrogen monoxide, nitrogen dioxide, ozone or oxygen.
- 35 6. The instrument of claim 1, 2, 3, 4 or 5, wherein the instrument is further adapted to measure the concentration of the first gas at a plurality of time points and to thereby monitor the rate at which the balance between nitrogen dioxide and nitrogen monoxide

changes in response to the effects of the equilibrium altering means.

7. The instrument of claim 1, wherein the first gas
5 sensor is an ozone sensor.

8. The instrument of claim 1, wherein the instrument is further adapted to allow for the effects of at least one factor, which factor is selected from the group
10 consisting of temperature and pressure, on the equilibrium between nitrogen dioxide and nitrogen monoxide.

9. A method for calculating the concentration of one or
15 more of nitrogen dioxide, nitrogen monoxide and ozone in air, the method comprising the steps of:

activating an equilibrium altering means for changing the equilibrium between nitrogen monoxide and nitrogen dioxide in the presence of ozone and oxygen in
20 an air sample;

taking at least three readings of the concentration of a first gas selected from the group consisting of nitrogen dioxide, nitrogen monoxide and ozone, wherein at least one of the at least three readings is taken before
25 the changes caused by the equilibrium altering means reach a steady state; and

calculating, on the basis of the at least three readings, the concentration in the air sample of at least one gas selected from the group consisting of nitrogen
30 dioxide, nitrogen monoxide and ozone.

10. The method of claim 9, wherein the equilibrium altering means comprises an ultraviolet light source.

35 11. The method of claim 9, further comprising the step of switching the ultraviolet source on and off periodically.

12. The method of claim 9, wherein the equilibrium altering means comprises a means for adding a gas selected from the group consisting of nitrogen monoxide, nitrogen dioxide and ozone.

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13. The method of claim 9, wherein the equilibrium altering means comprises a means for removing at least one gas selected from the group consisting of nitrogen monoxide, nitrogen dioxide, ozone and oxygen.

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14. The method of claim 9, wherein the at least three readings are taken at distinct points in time, and wherein the concentration of the first gas at the distinct points in time is used to calculate the rate at which the balance between nitrogen dioxide and nitrogen monoxide changes in response to the effects of the equilibrium altering means.

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15. The method of claim 9, wherein the at least three readings are of ozone concentration.

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16. The method of claim 9, further comprising the step of allowing for the effects of at least one factor, which factor is selected from the group consisting of temperature and pressure, on the equilibrium between nitrogen dioxide and nitrogen monoxide.

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17. A computer program which, when loaded onto a computer, is adapted to calculate the concentration of a gas in an air sample in accordance with the method of claim 9, 10, 11, 12, 13, 14, 15 or 16, wherein the gas is selected from the group consisting of nitrogen monoxide, nitrogen dioxide and ozone.

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18. A computer program which, when loaded onto a computer, is adapted to calculate the concentration of a gas in an air sample in accordance with the method of claim 9, wherein said program is disposed on a tangible

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medium.

19. A computer program which, when loaded onto a computer, is adapted to calculate the concentration of a gas in an air sample in accordance with the method of claim 10, wherein said program is disposed on a tangible medium.

20. A computer program which, when loaded onto a computer, is adapted to calculate the concentration of a gas in an air sample in accordance with the method of claim 11, wherein said program is disposed on a tangible medium.

21. A computer program which, when loaded onto a computer, is adapted to calculate the concentration of a gas in an air sample in accordance with the method of claim 12, wherein said program is disposed on a tangible medium.

22. A computer program which, when loaded onto a computer, is adapted to calculate the concentration of a gas in an air sample in accordance with the method of claim 13, wherein said program is disposed on a tangible medium.

23. A computer program which, when loaded onto a computer, is adapted to calculate the concentration of a gas in an air sample in accordance with the method of claim 14, wherein said program is disposed on a tangible medium.

24. A computer program which, when loaded onto a computer, is adapted to calculate the concentration of a gas in an air sample in accordance with the method of claim 15, wherein said program is disposed on a tangible medium.

25. A computer program which, when loaded onto a computer, is adapted to calculate the concentration of a gas in an air sample in accordance with the method of claim 16, wherein said program is disposed on a tangible medium.

26. A sensing apparatus for detecting components in atmospheric air as the sensor is drawn up through the atmosphere, the sensor comprising:

a sensor element;

shielding means for shielding the sensor element from direct contact with air flow as the sensor is drawn through the atmosphere; and

means for diverting air through the shielding means and over the sensor element as the sensor passes through the atmosphere.

27. The sensing apparatus of claim 26, wherein the means for diverting air comprises a gas conducting member shaped to provide a pressure differential across the shielding means and to cause air to move through the shielding means.

28. The sensing apparatus of claim 27, wherein the gas conducting member is shaped to provide a low pressure region at an entry to the shielding means and thereby draw air through the shielding means into the gas conducting member.

29. The sensing apparatus of claim 27, wherein the gas conducting member comprises a flow restricting member for diverting air that flows through the gas conducting member in use into the shielding means.

30. The sensing apparatus of claim 29, further comprising an aperture adapted to allow water or ice to flow out of the gas conducting member.

31. A sensing apparatus, comprising:

a sensor element;

means for regulating the temperature of the sensor element by providing heat energy to the sensor

5 element; and

means for calculating the air flow across the sensor element from the amount of heat energy supplied to the sensor element.

10 32. The sensor apparatus of claim 31, further comprising a means for measuring the temperature of the sensor.